Institut de la statistique du Québec

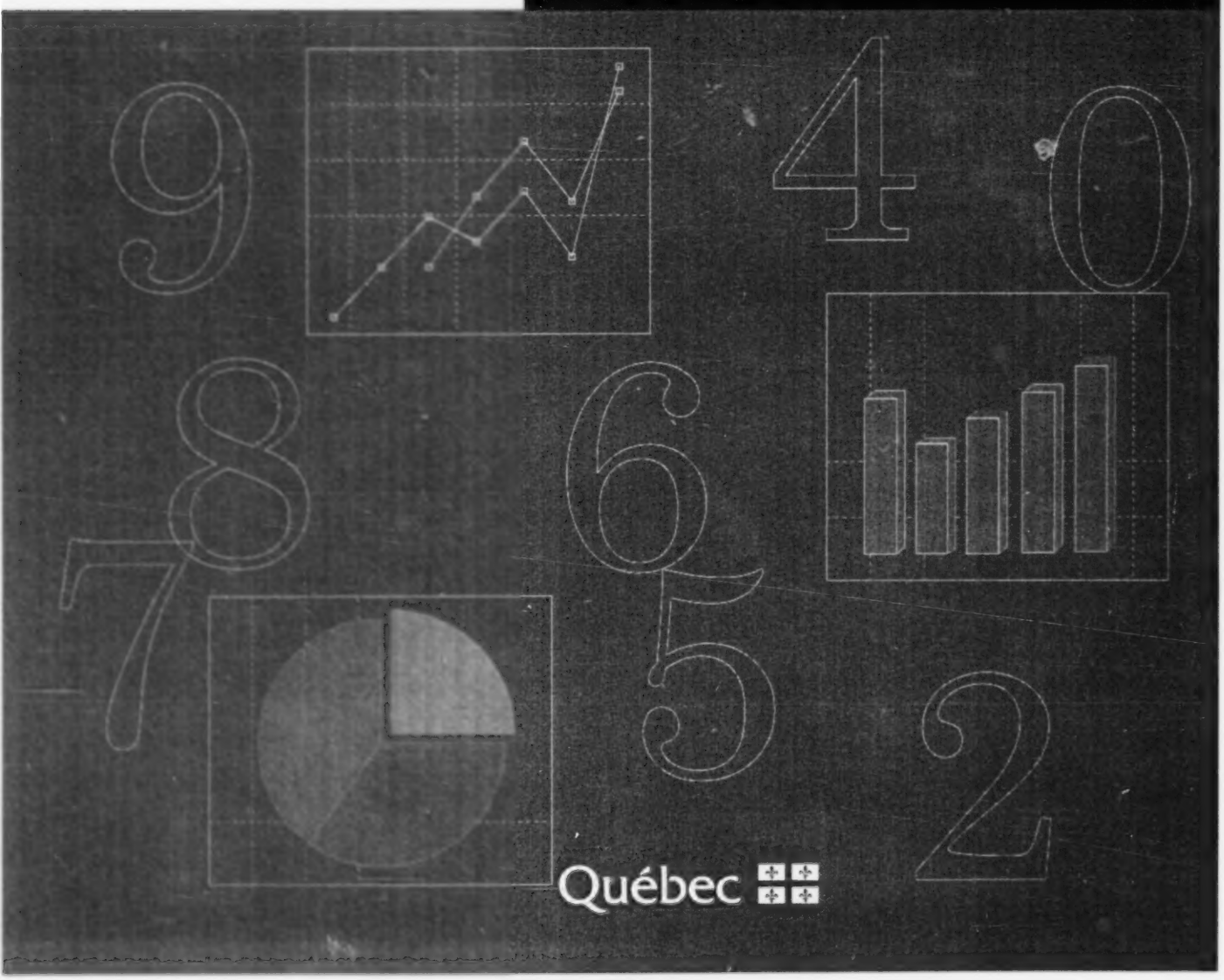
LONGITUDINAL STUDY OF CHILD DEVELOPMENT IN QUÉBEC (ÉLDEQ 1998-2002)

5-MONTH-OLD INFANTS

Habits Related to Oral and Dental Health

Volume 1, Number 6

COLLECTION
Health and Well-Being



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May 2000

Forward

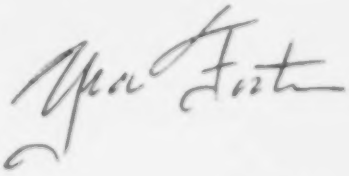
Similar to what has been observed in the majority of industrialized nations over the past twenty years, Québec and Canada have seen a significant increase in the costs related to maladjustment, particularly in young people. The Longitudinal Study of Child Development in Québec (*l'Étude longitudinale du développement des enfants du Québec*) (ÉLDEQ 1998-2002) being conducted by *Santé Québec* (Health Québec),[1] a division of *l'Institut de la statistique du Québec (ISQ)*[2] (Québec Institute of Statistics) in collaboration with a group of university researchers, will provide an indispensable tool for action and prevention on the part of government, professionals and practitioners in the field, who every day must face maladjustment in children.

More precisely, a major purpose of this longitudinal study of a cohort of newborns is to give Québec a means of preventing extremely costly human and social problems, such as school dropout, delinquency, suicide, drug addiction, domestic violence, etc. Similar to what is being done elsewhere (in the UK, New Zealand, the US), *Santé Québec* and a group of researchers have designed and developed a longitudinal study of children 0 to 5 years of age (2,223 children in this study and 600 twins in a related one). It will help gain a better understanding of the factors influencing child development and psychosocial adjustment.

The general goal of ÉLDEQ 1998-2002 is to learn the PRECURSORS, PATHS and EFFECTS, over the medium and long terms, of children's adjustment to school. ÉLDEQ is the logical extension of the National Longitudinal Study of Children and Youth (NLSCY, Canada). These Québec and Canada-wide longitudinal studies are both comparable and complementary. They employ distinct survey methods, and use different techniques to obtain the initial samples. Though many of the instruments are practically identical, about a third of those being used in ÉLDEQ are not the same.

This first report casts light on the enormous potential of the data generated by this study. From the descriptive analyses of the results of the first year of the study to the longitudinal analyses of subsequent years, there will be an enormous wealth of data. With updated knowledge on the development of the cohort of young children, the annual longitudinal follow-up will respond to the needs which the *ministère de la Santé et des Services Sociaux du Québec* - MSSS (Ministry of Health and Social Services), who financed the data collection, expressed in both the Report of the Working Group on Youth (*Rapport Bouchard, 1991, Un Québec fou de ses enfants* - the Bouchard Report, 1991, A Québec in Love with its Children) and the policy papers entitled *Politique de la santé et du bien-être, 1992* (Health and Well-Being) and *les Priorités nationales de santé publique 1997-2002* (Public Health Priorities 1997-2002).

Director General



Yvon Fortin

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1. Certain French appellations in italics in the text do not have official English translations. The first time one of these appears, the unofficial English translation is shown immediately after it. Following this, for ease in reading, only the official French name appears in the text in italics, and it is suggested the reader refer to the Glossary for the English translation.

2. *Santé Québec* officially became a division of the *ISQ* on April 1, 1999.

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This analytical paper is also available in French. [Ce numéro et aussi disponible en version française sous le titre « Habitudes reliées à la santé buccodentaire » dans *Étude longitudinale du développement des enfants du Québec (ÉLDEQ 1998-2002)*, Québec, Institut de la statistique du Québec, vol. 1, no 6].

Caution:

Unless indicated otherwise, "n" in the tables represents data weighted to the size of the initial sample.

Because the data were rounded off, totals do not necessarily correspond to the sum of the parts.

Unless explicitly stated otherwise, all the differences presented in this report are statistically significant to a confidence level of 95%.

To facilitate readability, proportions higher than 5% were rounded off to the nearest whole unit in the text, and to the nearest decimal in the tables and figures.

Weighting and the complex sample design were taken into account in calculating the results and their precision. The precision of the estimates of proportions was calculated using a mean design effect. This was also used for the chi-square tests, except in questionable cases for which the SUDAAN software program was used. In all other analyses, SUDAAN was used. Basic hypotheses, such as the normality of the data, were verified before applying the selected statistical tests.

Symbols

... Not applicable (N/A)
.. Data not available
-- Nil or zero
p < Refers to the threshold of significance

Abbreviations

CV	Coefficient of variation
Not avail	Not available
not signif.	Not significant

Acknowledgments

Santé Québec recognizes that the development and implementation of the Longitudinal Study of Child Development in Québec (ÉLDEQ 1998-2002) flows directly from the synergy of effort and professionalism of many people throughout the whole process of mounting a survey of this size. Since 1995, individuals, various groups and organizations, a survey firm and the staff of *Santé Québec* have become indispensable links in making this ambitious project a reality - the first annual longitudinal survey of Québec infants.

A major characteristic of this project is that a pretest and survey are conducted every year. To accomplish this, we must annually: 1) make two sets of instruments (pretest and survey), 2) conduct two data collections, 3) analyze two sets of data, and 4) produce two types of communications materials. The results of each pretest means fine-tuning and developing instruments for the survey, which follows 17 months later. The results are sent to the parents (highlights), published in reports, and communicated to the scientific community and the public at large. The professionals and staff involved in collecting the data, as well as those involved before and after, must put their nose to the grindstone every year. We cannot over-emphasize our profound recognition of the incredible, concerted effort they are putting into this project over an 8-YEAR period, from the first pretest in 1996 to the final report to be published in 2004!

First, it must be said that without Daniel Tremblay, Director of *Santé Québec* (now part of the *ISQ*) since 1994, Christine Colin, Assistant Deputy Minister responsible for Public Health 1993-1998, Aline Émond, Director of *Santé Québec* 1986-1993, Richard E. Tremblay, Director of the ÉLDEQ research project, and Marc Renaud, President of *le Conseil québécois de la recherche sociale - CQRS* 1991-1997. ÉLDEQ 1998-2002, also known as "In 2002...I'll Be 5 Years Old!," would have never seen the light of day. In turn and together, they developed, defended and obtained the financing for this study. Thank you for your indefatigable tenacity.

A warm thanks to all the researchers and the support staff of their respective research groups, whose determination over the years has never wavered. Putting their research grants together every year has contributed to the development of the instruments, analysis of the data and publication of the copious results.

I would like to thank Lyne Des Groseilliers, ÉLDEQ's statistician since 1996, Robert Courtemanche, statistical advisor, and France Lapointe, ÉLDEQ's statistician 1995-1996. These three colleagues in the *Direction de la méthodologie et des enquêtes spéciales* (Methodology and Special Surveys Division) *ISQ* managed, with great skill, to set the signposts and navigate the somewhat winding course of this large-scale survey first.

A very special thanks to all the master designers of the National Longitudinal Study of Children and Youth (NLSCY, Canada). Without their expertise, advice and generosity, our survey would never have been accomplished. In many senses of the word "modeling," ÉLDEQ has learnt a lot from the NLSCY.

We would also like to extend out gratitude to the staff of the *Groupe de recherche sur l'inadaptation psychosociale chez l'enfant - GRIP* (Research Unit on Children's Pyschosocial Maladjustment) at the University of Montréal. Without their expertise, some of our survey instruments would have never been computerized to such a high level of quality.

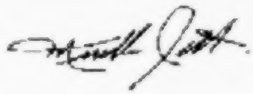
We would like to thank the personnel in the *Service de support aux opérations de la Régie de l'assurance-maladie du Québec - RAMQ* (Operations Support section of the Québec Health Insurance Board). Without their efficiency, fewer letters of introduction would have found their way to the correct addresses of respondents.

Our sincerest thanks go to our survey firm, *Bureau d'interviewers professionnels (BIP)*. Since 1996, this polling company has been responsible for data collection in the pretests and surveys, and follow-up of families both inside and outside of Québec. Lucie Leclerc, President of *BIP*, has set the standard of quality for our numerous and complex data collections. Assisted by Véronique Dorison, she has instilled in her interviewers a great sense of respect for the respondent families, as well as a rigourous regard for all the norms governing this first-of-a-kind survey in Québec.

A big thank-you to the directors-general, directors of professional services, and staff of the medical records departments of some 80 hospitals in the province who accepted to collaborate in our study at a time when resources were rare and time was at a premium, and when the medical records departments in many hospitals were merging or in the process of doing so. Their support was exceptional. Birthing centres also graciously accepted to participate in this first Québec longitudinal study of children. A special thanks to Julie Martineau, medical records specialist, who contributed to the analysis of indispensable medical information by ensuring very rigourous coding of the data, which often lay concealed in the medical files of the infants and their mothers.

It goes without saying that the staff of *Santé Québec* Division directly attached to ÉLDEQ 1998-2002 are the cornerstone of its success from practically every point of view. Special thanks for their ongoing contribution and constant hard work go to Hélène Desrosiers and Josette Thibault, responsible respectively for analysis of the data and creation of the measurement instruments; Martin Boivin, Rolland Gaudet and Gérald Benoît, who constantly pushed the limits of what computer software can do in terms of programming and data processing; Suzanne Bernier-Messier and Diane Lord, who give meaning to the word versatility, who must organize, code and manage incredible quantities of data to ensure the progress of the study. Not directly attached to the team but who made extremely important contributions are: France Lacoursière, France Lozeau and Thérèse Cloutier, who put the finishing touches to the *Santé Québec* "look" in the survey instruments, reports and conference publications; Lise Ménard-Godin, who conducted fruitful literature searches and advised on many aspects of the collection instruments. The hard work, constant availability, ability to adapt, and finely-honed skills of the people working on this project match the enthusiasm that all our partners have demonstrated in making this study a resounding success.

Finally, I would like to extend a very special thank-you to the 2,223 families who responded to our survey. Thank you for the trust you have shown in *Santé Québec*, our partners and collaborators. Thanks to your participation, your children have become the veritable stars of ÉLDEQ 1998-2002, and are making it possible, in the short term, to gain a better understanding of psychosocial adjustment in children. In the medium and long terms, they will likely be in large part responsible for the establishment of early detection programs, better designed prevention programs, and more effective interventions for such an important clientele - all of Québec's children.



Mireille Jetté
Project Coordinator
Santé Québec Division, *ISQ*

Preventing Social Maladjustment

It suffices to consider the costs engendered by behavioural problems in children - school dropout, delinquency, alcoholism, drug addiction, family violence, mental disorders and suicide - to conclude that they largely surpass what a modern society can accept, morally and economically. Faced with the enormity of these problems, the first reflex is to provide services to these people which will, ideally, make the problems disappear, or at the very least, lessen their severity. For many years we have tried to offer quality services to children and adults who suffer from antisocial disorders, alcoholism, drug addiction, depression, and physical or sexual abuse. However, in spite of enormous investment, these curative services are far from being able to respond to the demand.

Although the idea of early intervention as a preventive measure can be traced at least as far back as ancient Greece, the second half of the 20th century will certainly be recognized as the dawn of the field of social maladjustment prevention (Coie *et al.*, 1993; Mrazek & Haggerty, 1994). Numerous programs have been developed for adolescents and teenagers to prevent school dropout, delinquency, drug addiction and suicide. Scientific evaluations of these programs have been far too few in number, but they tend to demonstrate that it is extremely difficult to help those most at risk in this age group (Rosenbaum & Hanson, 1998; Rutter, Giller & Hagell, 1998; Tremblay & Craig, 1995). It is becoming increasingly clear that the factors which lead to serious adaptation problems are in place long before adolescence. Hence the idea that the prevention of social adaptation problems should start at least during childhood, and preferably right from pregnancy (Olds *et al.*, 1998; Tremblay, LeMarquand & Vitaro, 1999). These principles are clearly outlined in the objectives of the *Politique de la santé et du bien-être* (Policy on Health and Well-Being) and *les Priorités nationales de santé publique* (Priorities for Public Health) set by the government of Québec (ministère de la Santé et des Services sociaux, 1992; 1997).

The Need to Understand Early Childhood Development

If the field of maladjustment prevention appeared at the end of the 20th century, it has certainly come on the heels of child development. "*Émile,*" by Jean-Jacques Rousseau, needs to be re-read in light of recent studies to realize just to what degree it is impossible to understand the complexity of child development, and therefore the means of preventing deviant paths, simply by reflection or introspection. Although considerable knowledge has been acquired in the neurological, motor, cognitive, affective and social development of children, what really hits home is that Jean-Jacques Rousseau and his followers in education seemed to have had more certainty about the ways of educating children than we do today.

Progress in child development research has made us realize that things are not as simple as we can or would like to imagine. We have obviously all been children, and most of us have become parents, indeed, relatively well-adjusted ones. But we still do not clearly understand when, how and why adjustment problems appear, and above all, how to prevent and correct them.

Our ignorance is obvious when we examine the debates among specialists on the role of parents in the development of maladjustment problems in children. Some suggest that social maladjustment in children is largely determined by genetic factors (Bock & Goode, 1996; Rowe, 1994). Some accentuate economic factors (Duncan & Brooks-Gunn, 1997). Other researchers attribute a determining role to peer influence (Harris, 1998; Harris, 1995; Vitaro *et al.*, 1997). These larger questions lead to narrower ones which focus on particular aspects - the role of fathers in childhood maladjustment, the impact of alcohol and cigarette consumption during pregnancy, the effect of prenatal and birthing problems, the importance of breast feeding and diet; the role of sleep, cognitive development, temperament, and so on.

The majority of these questions are at the heart of the daily concerns of parents, grandparents, educators, family service providers, and legislators. What can we do to maximize the development of our children, to prevent severe psychosocial maladjustment? What should we do when problems begin to

appear, when pregnant mothers, or fathers themselves have a long history of disorders? The answers to these questions obviously have an effect on the policies put forth by Québec government Ministries such as *ministères de la Famille et de l'Enfance* (Family and Child Welfare), *de l'Éducation* (Education), *de la Santé et des Services sociaux*, *de la Solidarité sociale* (Social Solidarity - formerly Income Security (Welfare)), *de la Sécurité publique* (Public Security), *de la Justice* (Justice), and *le ministère de la Recherche, Science et Technologie* (Research, Science and Technology).

The Contribution of ÉLDEQ 1998-2002

The Longitudinal Study of Child Development in Québec (ÉLDEQ 1998-2002) was conceived in order to contribute to our knowledge of the development of children in their first 5 years of life. The main goal is to gain a better understanding of the factors, in the years of rapid growth, which lead to success or failure upon entry into the school system. The goal of the second phase (if approved) is to better understand development in elementary school, in light of development in early childhood.

We know that this survey cannot be a definitive one on child development in Québec, but it is the first representative study of a provincial cohort of children who will be measured annually from birth to entry into the school system. It specifically aims at understanding the development of basic skills needed for educational success.

Although the effort to set up this study began in 1989, the first data collection coincided with the Québec government's implementation of its *Politique Familiale* (Policy on Families). The policy has virtually the same objectives as our study:

> "These services for children 5 years and under should give all Québec children, whatever the socioeconomic status of their parents, the chance to acquire and develop the skills that will allow them to succeed in school (1997, p. 10)."

On March 3 1999, in the speech opening the 36th session of the Québec legislature, Premier Lucien Bouchard confirmed that early childhood development was a priority for the government:

> "The theme that will dominate our actions this year, next year, and throughout our mandate, is youth... The priority...with regards to youth in Québec, begins with the family and childhood... This massive investment in early childhood... will give our children the best chance of success in the short, medium and long terms. It is our best asset against alienation and despair. It is our best preparation for personal, social and economic success."

Because of this historic coincidence, ÉLDEQ has the potential of becoming an invaluable tool for monitoring the effects of Québec's massive investment in early childhood which began in 1997. Thanks to the data collected by the federal government's National Longitudinal Study of Children and Youth (NLSCY, Canada), we will be able to compare child development in Québec with that elsewhere in Canada, before and after the implementation of Québec's new policy on the family.

However, our initial objectives are more modest. The 12 or 13 papers in this series present the results of our first annual data collection. They describe the characteristics of the families and children when the latter were 5 months old.[3] They cover sociodemographic characteristics, nature of the birthing process, health and social adaptation of the parents, family and couple relations, parent-infant relations, and characteristics of the 5-month-old, such as sleep, diet, oral hygiene, temperament, and motor, cognitive and social development. These data will eventually be compared to those on children the same age collected by the NLSCY in 1994 and 1996.

An Interdisciplinary, Multi-University Team of Researchers

This study saw the light of day because of the collaboration of many people. In the preceding pages, Mireille Jetté thanked a number of them. I would like to take advantage of this introduction to emphasize that the survey was set up and continues forward

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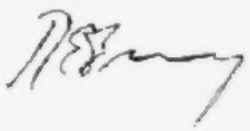
3. To simplify the text in this report, the phrase "5-month-old infants" will be used to refer to infants whose mean age was 5 months during data collection in 1998. In section 3.1.3 (Volume 1, Number 1), we explain why the infants were not all exactly the same age. As indicated in no. 2 of this series, 52% of the infants were less than 5 months, and 3.4% were 6 months of age or over.

because of the dedication and hard work of a group of researchers from a variety of disciplines and universities. I would particularly like to thank Michel Boivin, School of Psychology at Laval University, and Mark Zoccolillo, Department of Psychiatry at McGill University, who have been actively involved in this project since 1992. It was in that year that we prepared out first grant application for the Social Sciences and Humanities Research Council of Canada. A second group of researchers joined the team in 1993 and 1994: Ronald G. Barr, pediatrician, Montréal Children's Hospital Research Institute, McGill University; Lise Dubois, dietitian and sociologist, Laval University; Nicole Marcil-Gratton, demographer, University of Montréal and Daniel Pérusse, anthropologist, University of Montréal. Jacques Montplaisir, Department of Psychiatry, University of Montréal, joined the team in 1995. Louise Séguin, Department of Social and Preventive Medicine, University of Montréal and Ginette Veilleux, Public Health Department of Montréal-Centre, joined in 1998. Three post-doctoral researchers have also made an important contribution. Raymond Baillargeon developed the task for measuring cognitive development. Christa Japel is the assistant to the scientific director for planning, analysis and presentation of the results. Heather Juby collaborates in the analysis of the data on couple and family history.

A Unique Confluence of Circumstances

A study such as this requires the coordination of many researchers over many years, enormous financial resources, and a long period of preparation. Though in the early 1990s the research team was convinced of the need for the survey, those responsible for the public purse had also to be convinced. We must therefore acknowledge the happy confluence of circumstances that allowed the players to take advantage of the opportunity at hand. When a number of civil servants in the *ministère de la Santé et des Services sociaux* understood the essential role of prevention, the creation of a committee on children and youth in 1991 led to an increased awareness of the importance of early childhood. At the same time, the president of the *CQRS*, Marc Renaud, had come to the same realization with his colleagues in the Population Health Program at the Canadian Institute for Advanced Research (CIAR). Aline Émond, the Director of *Santé Québec*, was ready to apply her formidable determination to work for the cause. For their part, Health Minister Jean Rochon and his Assistant Deputy Minister for Public Health, Christine Colin, aware of the importance and benefit of longitudinal studies on early childhood development, authorized the investment of large sums of money during a period of draconian budget cuts. This occurred at the same time as the federal government decided to create its own longitudinal study of children and youth (NLSCY). It is in this context that ÉLDEQ 1998-2002 materialized. Our survey also came to fruition because Mireille Jetté did everything in her power to make the researchers' dreams a reality, and Daniel Tremblay gave her all the support she needed by making various resources available for the project.



Richard E. Tremblay, Ph.D., M.S.R.C.
Chair of Child Development
University of Montréal

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Review of the Methodology

This analytical paper is one of a series presenting cross-sectional data collected on a large sample of 5-month-old infants surveyed in 1998. It reports on the first of 5 annual data collections on 2,120 children in Québec who will be studied until they are 5 years old. In the first year of data collection, the results on 2,223 infants were retained.[4]

The target population of the survey is Québec babies, singleton births only,[5] who were 59 or 60 weeks of gestational age[6] at the beginning of each data collection period, born to mothers residing in Québec, excluding those living in the Northern Québec, Cree, and Inuit regions, and on Indian reserves, and those for whom the duration of pregnancy was unknown. Due to variations in the duration of pregnancy and the 4 or 5 weeks allotted for each data collection wave, the infants were not all exactly the same age (gestational or chronological) at the time of the survey. Therefore, the children in Year 1 (1998) of the survey had a mean gestational age of 61 weeks - about 5 chronological months.

The survey had a stratified, three-stage sampling design, with a mean design effect for the proportions estimated at 1.3. To infer the sample data to the target population, each respondent was given a weight corresponding to the number of people he/she "represented" in the population. ÉLDEQ 1998 comprised eight main collection instruments which obtained data from the person who was closest to the baby (called the Person Most Knowledgeable - PMK), the spouse (married or common-law), the infant and the absent biological parent, if applicable. Given variation in the response rates to each instrument, three series of weights had to be calculated to ensure inferences to the population were accurate. Except for the Self-Administered Questionnaire for the Absent Father (SAQFABS) and a series of questions in the Computerized Questionnaire Completed by the Interviewer (CQCI) on absent fathers - the overall or partial response rates of which were too high - the results of all the instruments could be weighted. Therefore, the data presented here have all weighted to reduce the biases.

All data that had coefficients of variation (CV) higher than 15% are shown with one or two asterisks to clearly indicate the variability of the estimate concerned. In addition, if the partial non-response rate was higher then 5%, there is a note specifying for which sub-group of the population the estimate is less accurate.

Similar to any cross-sectional population study, the Year 1 part (5-month-old infants) of ÉLDEQ 1998-2002 has certain limits. However, the vast majority of the results are valid and accurate, and provide a particularly detailed portrait, for the first time, of 5-month-old infants in Québec.

Note to the reader: For more details on the methods, see Volume 1, Number 1 in the present series. Detailed information on the sources and justification of the instruments used in Year 1 of ÉLDEQ 1998-2002, and the design of the scales and indices used in this paper, are covered in Number 12, entitled "Concepts, Definitions and Operational Aspects."

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4. Though the results for 2,223 children were retaindes for the first year of data collection, 2,120 will be retainded for the rest of the longitudinal study; the extra 103 were part of an over-sample used to measure the effects of the January 1998 ice storm.

5. Twins (twins births) and other multiple births were not targeted by the survey.

6. Gestational age is defines as the sum of the duration of gestation (pregnancy) and the age of the baby.

1. Introduction

The nature and frequency of oral health problems in Québec children under 5 years of age are still poorly known. Although the biological risk factors are well-understood, they do not completely explain the etiology of dental caries. Behavioural, psychosocial and socioeconomic factors are also associated, but their role has not been well documented. Information is also lacking on factors associated with other dental problems such as misalignment of teeth in young children. The above observations clearly indicate the need for characterizing the determinants of dental health in children under 5 years of age. Data derived from ÉLDEQ 1998-2002 will help do this, thereby contributing to the design of appropriate prevention programs. This will foster the application of the Loi sur la protection de la santé publique (L.R.Q., chapitre P-35) (Revised Statutes of Québec, Chapter P-35), in which the Health Minister must assure that preventive dental health services are in place. The results of the survey will also contribute to fulfilling one of the objectives of the *Politique de la santé et du bien-être*, which is to reduce by 50% the average number of decayed, missing or filled teeth in children 6 to 12 years of age, by the year 2002 (ministère de la Santé et des Services sociaux - MSSS, 1992).

A number of studies have been conducted on the dental health of children in Québec. However, they were mostly cross-sectional and were conducted on older children (Brodeur *et autres*, 1999; Payette *et autres*, 1991; Payette *et autres* , 1987). Their results show that, similar to what has been observed elsewhere in industrialized countries, dental caries is declining, notably in children 7-8 years of age. Tooth decay is not uniformly distributed in the population, but is concentrated in a defined group of children considered at high risk. Major socioeconomic factors associated with higher risk of caries in primary dentition are: income below the poverty line, low educational level of the father and mother, low occupational category of the father or mother, and the fact that the family is receiving social assistance (welfare). In light of these, the unequal distribution of caries seems to match social inequality. Other explanatory factors related to socioeconomic status are specific health behaviours such as not having visited a dentist for one year, having visited a dentist for curative treatment only, or having poor oral hygiene (Payette *et autres*, 1991). Data collected on school children in the Montérégie region of Québec showed that approximately 40% of 5 to 6-year-olds already had caries (Corbeil *et autres*, 1996). With regards to the frequency of tooth alignment problems, approximately 15% of Québec children 7-8 years of age have an obvious need for orthodontic treatment (Payette *et autres*, 1991).

Disparity in dental health status is being observed while the range of dental services is far from being completely covered by Québec Medicare. Furthermore, the vast majority of towns in Québec do not have fluoridated water, so children cannot benefit from its protective effects. The *Programme de services dentaires pour les enfants* (Dental Program for Children), administered by the *Régie de l'assurance-maladie du Québec - RAMQ* covers diagnosis and treatment but does not cover preventive services in private practice. Moreover, the age of eligibility is limited to children 9 years of age and under, and the number of annual dental examinations covered was reduced in 1997 from two to one. Only 18% of children under 4 years of age took advantage of this program in 1997 (*RAMQ*, 1998).

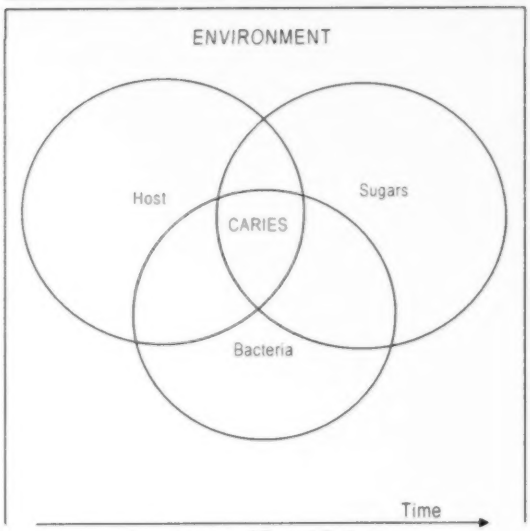
To compensate for these restrictions in dental services, in 1982 the *Ministère de la Santé et des Services sociaux du Québec (MSSS)* mandated the *Directions de la santé publique* and CLSCs (Community Health Centres) to provide free preventive services to children. The *Programme public de services dentaires préventifs* (Public Program of Preventive Dental Services) (*MSSS*, 1990) was thus implemented, targeting children 0-12 years of age. Although this program is mainly organized in schools, particularly for children with a high risk of caries, all the CLSCs in 1994-1995 also conducted promotional and preventive interventions among pre-school children. However, these interventions varied by CLSC, and did not reach all parents and children (Durocher & Brodeur, 1998). In addition, recent Montréal data indicate that their frequency would probably be reduced, given the lack of human and financial resources (Généreux, 1998).

The dental health of children under 5 years of age proceeds directly from preventive practices and parenting attitudes and behaviours. To address these, the *Ordre des dentistes du Québec - ODQ* (Québec Order of Dentists) (ODQ, 1999) and the Canadian Dental Association (CDA, 1999) have put forth recommendations for parents before and when their children's first teeth erupt. With regards to preventing caries, it is recommended to clean the baby's gums before the first teeth appear, brush the

teeth twice a day with a fluoride toothpaste, give fluoride supplements when drinking water has not been fluoridated, not to let the baby fall asleep with a bottle of anything other than water, and to limit the frequency of consumption of sugary foods. To prevent tooth alignment problems, parents are advised to control the sucking habits of the children under 5 years of age. To complement these personal guidelines, parents are advised to take their child for his first visit to the dentist by the age of one. It should be noted that the parents of the target infants in this first year of the survey may have been exposed to varying messages, given the inherent delay between current scientific knowledge and the publication of updated information in documents destined for the public. For example, the guide From Tiny Tot to Toddler is free and given to all mothers who give birth to a baby in a hospital or birthing centre in Québec, so parents may have read varying editions (Doré & Le Hénaff, 1998).

The development of dental caries is a process of infection that requires three simultaneous factors over time - a susceptible host, bacteria and sugars (see Figure 1.1). It is an infectious disease mediated by diet, hygiene and host resistance, the latter increasing with optimum intake of fluoride. Caries can affect speech, such as pronunciation, and facial aesthetics, such as smiling, both of which can have a psychological impact on a child. Caries can also affect mastication, possibly resulting in poor diet and stunted growth (Lacroix *et autres*, 1997). A particular manifestation of morbidity, called baby bottle or early childhood caries, has been observed in very young children. It is characterized by very rapid destruction of tooth structure (Ismail, 1998; Reisine & Douglass, 1998; Ripa, 1988). It is considered a social problem because it specifically affects ethnic minorities and immigrant populations as well as families with low incomes (Ismail, 1998; Weinstein, 1998; Weinstein *et al.*, 1996a). Many observers suggest it results from ignorance of the deleterious effects of constantly letting a child fall asleep with a bottle containing breast milk, cow's milk, formula, or juice. Prolonged exposure of the teeth to the sugars in these liquids can increase the risk of caries. Others suggest that breast feeding on demand, for example, throughout the night, constitutes another risk factor (Matee *et al.*, 1994). Though the habit of giving a pacifier (soother) dipped in a sweet substance such as honey or sugar to calm the baby is another risk factor (Eronat & Eden, 1992), little information exists on its prevalence in Québec.

Figure 1.1



Development of Dental Caries

Source: *Institut de la statistique du Québec, ÉLDEQ 1998-2002.*

According to a review of 12 studies on the use of the baby bottle (Reisine & Douglass, 1998), 18% to 85% of parents reported that their baby was taking or had taken a bottle to bed. The large variability observed in the results of these studies is undoubtedly related to differences in the methods used. For example, the concept of having the bottle in bed is not a constant among the studies so that the prevalence could vary according to the definition used. Another important measurement problem is the retrospective nature of 8 of the 12 studies, which makes them subject to memory bias (Albert *et al.*, 1988; Derkson & Ponti, 1982; Febres *et al.*, 1997; O'Sullivan & Tinanoff, 1993; Powell, 1976; Schwartz *et al.*, 1993; Serwint *et al.*, 1993; Weinstein *et al.*, 1992). Moreover, it was these retrospective studies that reported the highest prevalences. Furthermore, the child populations studied were almost all older than 5 months, and their age groups had a wider range than the babies targeted by Year 1 (1998) of ÉLDEQ 1998-2002. Certain studies also suffer from serious selection bias related to the sampling of a very specific, homogeneous population, such as patients of a specific dental practice or medical clinic (Febres *et al.*, 1997; Powell, 1976; Schwartz *et al.*, 1993; Serwint *et al.*, 1993), or were conducted on particular ethnic groups (Albert *et al.*, 1988; Godson & Williams, 1996; Weinstein *et al.*, 1992). However, the results of two

of these studies (Hinds & Gregory, 1995; Kaste & Gift, 1995) seem more valid because they studied current use of the bottle when putting the child to bed in a random sample representative of a general population. They reported prevalences of 18% and 20% in children aged 6 to 60 months and 30 to 42 months respectively. Reisine & Douglass (1998) note that using a bottle at bedtime was as frequent in children free of caries as it was in those with caries, indicating the importance of conducting studies on the etiology and population prevalence of this disease. As to breast feeding on demand, these authors report that few epidemiological studies have been conducted. However, they refer to a Canadian study showing that, among pre-school children with caries, 22% had been exposed to prolonged breast feeding through the night at 6 months of age, whereas in children without caries, only 6% had been exposed (Derkson & Ponti, 1982). They also cite studies showing that caries can develop in children being breast fed exclusively (Al-Dashti *et al.*, 1995; Holt *et al.*, 1982; Roberts *et al.*, 1993; Silver, 1992).

Chronic sucking habits often lead to tooth alignment problems that are generally reversible in primary dentition, but are associated with malocclusions in permanent dentition (Buithieu & Dubé, 1996). A normal physiological reflex in newborns, sucking is nutritive when it is applied to breast feeding, bottle feeding or both. It is considered non-nutritive when applied to a digit, pacifier or other object. It is often related to a psychological need for comfort and reassurance. This habit usually begins at the age of 3 or 4 months and can affect dentition (Massler, 1983) depending on its intensity, duration and frequency (Morley & McIntyre, 1994; Popovich & Thompson, 1973). The pacifier seems easier for parents to control and easier for the child to abandon than the thumb (Shein *et al.*, 1991; Turgeon-O'Brien *et al.*, 1996). Its effects on the development of malocclusions may be less than those associated with sucking a finger (Nowak, 1991; Vadiakas *et al.*, 1998). The most-often observed effect of non-nutritive sucking is the displacement of dento-alveolar structures in the anterior segment of the maxilla (Bruun *et al.*, 1991). For this reason, it can affect appearance, swallowing and speech in some children. The results of a study conducted on children in the first grade (between 6 and 8 years of age) showed that chronic thumb-sucking may impede acceptance of a child by his peers, at a critical age for social development (Friman *et al.*, 1993). The prevalence of thumb-sucking may be approximately 30% in children 1 year of age (Turgeon-O'Brien *et al.*, 1996).

Pacifier use appears to be more widespread. A study conducted in the United States on 1,235 babies 6 weeks to 12 months of age showed that at 6 months, 59% of babies were using a pacifier (Levy *et al.*, 1998). However, a convenience sample was studied and the use of the pacifier was not defined. In a study conducted on Cambodian mothers with at least one child of pre-school age born in the US, only 20% of the 186 mothers interviewed indicated having ever given their baby a pacifier, given the negative beliefs they associated it with (Rasbridge & Kulig, 1995). In Québec, 89% of 1,937 primiparous mothers with a 6-month-old baby reported in interviews having already offered a pacifier to their child; however, in 16% of cases, the infant had refused it (Lepage & Moisan, 1998).

The same authors (Lepage & Moisan, 1998) reported that 18% of infants approximately 6 months of age had already taken fluoride supplements.

Year 1 (1998) of ÉLDEQ provided data on many habits related to the oral health of 5-month-old infants. Using a baby bottle to help the infant fall asleep at bedtime and/or for naps during the day, and the contents of the bottle were investigated. Breast feeding on demand, however, was not documented. Though one of the practices recommended in Québec to lengthen the period of breast feeding (Doré & Le Hénaff, 1998) and associated with growth spurts in babies, it is difficult to measure its exact frequency. For example, breast feeding at will throughout the night is hard to evaluate.

Although the use of the pacifier is among the non-nutritive habits of sucking, the data collected on the 5-month-old infants did not provide a precise estimate of its prevalence. This habit, whether the infant is awake or asleep, will be studied in future years of the longitudinal survey. In Year 1, only the availability of the pacifier (alone or in association with another object) as a transitional object for falling asleep was examined.

Taking vitamins and/or minerals containing fluoride was studied, given that the infants were approaching the age at which it is recommended to take these supplements. Studying the compliance with this recommendation was pertinent, since in the majority of municipalities in Québec, children do not benefit from the protective effects of fluoridated water.

In the analysis that follows, certain characteristics of the baby such as birth order, premature status, low birth weight and sleep habits are examined in light of using the bottle in bed and availability of the pacifier for falling asleep. In the literature, the results of a study on children of pre-school age demonstrated an association between caries and birth order in the family, the lowest risk being in the second and third children (Kinirons & McCabe, 1995). The fact of being prematurely born with low birth weight can foster the use of the baby bottle, increasing the risk of caries (Fadavi *et al.*, 1993). In young children between 2 and 4-and-a-half years of age, sleep problems were a behavioural risk factor associated with using the bottle at night (Shantinath *et al.*, 1996).

With regards to socioeconomic characteristics, variables were retained for this analysis that have previously been associated with caries in Québec children, namely insufficient family income (to meet basic needs), low educational level of mother or father, and the family being on social assistance (welfare) (Payette *et autres*, 1991). Being foreign-born has also been associated with inappropriate use of the bottle by parents of Canadian children 19 months of age (Weinstein *et al.*, 1996b).

ÉLDEQ 1998, conducted on a sample of 2,223 infants representative of 5-month-old babies, has provided, for the first time in Québec, data on habits related to dental health at an early age. Parenting practices could therefore be documented without the bias associated with retrospective studies conducted on older children. Other practices related to oral hygiene, diet and sucking habits of the child will be examined in future years of ÉLDEQ 1998-2002. By monitoring these habits and parenting practices, it will be possible to gain a better understanding of their role in the etiology of oral and dental health problems.

2. Using the Bottle in Bed to Help the Baby Fall Asleep at Night

The ÉLDEQ 1998 results shown in Table 2.1 indicate that nearly 8% of 5-month-old infants were taking a bottle to bed several times a week or every night (weekly frequency). Among the latter, 18% kept it with them while sleeping, comprising 1.3% of all infants (data not shown).

Table 2.1
Distribution of Infants by Use of Bottle to Fall Asleep at Night, Certain Sleep Habits and Feeding Methods, 1998

	Bottle to fall asleep at night[1]		x^2
	Never	Sometimes or every night	
	%		
Sleeps through the night			
Yes	94.3	5.7	$p < 0.001$
No	86.9	13.1	
Time to fall asleep			
Less than 30 minutes	93.1	6.9	Not signif
30 minutes or more	87.5	12.5**	
Breast feeding			
Currently	98.2	1.8**	$p < 0.001$
Never or had stopped	89.6	10.4	
Total	**92.5**	**7.5**	--

** Coefficient of variation (CV) higher than 25%; imprecise estimate for descriptive purposes only.
1. Weekly frequency.

Source: *Institut de la statistique du Québec, ÉLDEQ 1998-2002.*

Most of the bottles contained infant formula (78%), with cow's milk (17%) comprising a distant second. Other contents reported accounted for 1% or less each - formula with cereal or Farlay's type biscuits, breast milk, water, juice or other unspecified products (data not shown).

2.1 Frequency of Bottle Use at Bedtime by Certain Characteristics of the Baby

It could be expected that parents' behaviours would differ for the firstborn or vary with certain health characteristics of the baby. However, the results of ÉLDEQ 1998 revealed that use of the bottle for falling asleep at night was not associated with birth order. This was also the case for premature status and low birth weight, characteristics for which different parenting practices might be expected (data not shown).

In terms of the possible association with health status of the infant as perceived by the mother, babies described as having less than optimum health status, namely acceptable to very good, were twice as likely to have a bottle to fall asleep at night than those perceived in excellent health (11% vs. 6%). Health problems, even minor or occasional, could therefore be associated with this practice (data not shown).

As shown in Table 2.1, there was an association between this behaviour and certain sleep habits. The proportion of infants who fell asleep at night sometimes or always with the help of a bottle but were not sleeping through the night (13%) was more than twice that of those who were sleeping through the night (6%).[7] In the same vein, parents seemed more likely to give the baby the bottle in bed (13%) when he was taking 30 minutes or more to fall asleep than when he took less then 30 minutes to do so (7%). This result, however, was not significant at the 0.05 threshold.

Only 1.8% of infants being fed mother's milk at the time of the survey, either breast fed or in the bottle, exclusively or in combination with cow's milk or formula, were put to bed with the bottle, compared to 10% whose mother had never breast fed or had ceased to do so. Moreover, the 17% of babies who were being exclusively breast fed had a very low frequency (0.5%) of being put to bed with the bottle (data not shown).

7. As reported by the mother (see No. 4, "Sleep," in this series of analytical papers).

2.2 Sociodemographic Characteristics Associated with Use of the Bottle to Fall Asleep at Night

As an exploratory measure, analyses were conducted on sociodemographic characteristics of the fathers living in the household related to the practices being studied. Since the results were comparable to those obtained for the mothers, they are not presented here. However, it should be emphasized that virtually all respondents to the Paper Questionnaire Completed by the Interviewer (PQCI) were the biological mothers of the infants.

The sociodemographic characteristics presented in Table 2.2 show that the age group of single or both parents was not associated with the practice of putting the baby to sleep with a bottle at night, sometimes or every day. Mothers who had not completed high school (14%), however, were more likely to do this compared to those who had a high school or vocational/technical school diploma (8%), or college or university degree (4.4%).

Immigration status of the mother was also associated with use of the baby bottle to help the baby fall asleep at night. This practice was more than three times higher in non-"European" immigrant mothers (19%) than in non-immigrant or "European" immigrant ones (6%). It can be construed that these mothers were using practices based on the beliefs and values of their country of origin. For example, in a study of Cambodian mothers of children born in the US, the bottle was not only used for feeding, but was also seen as an effective means of calming the baby. Coming from a culture where breast feeding on demand is a predominant value, it is not surprising however that half of these mothers reported giving the baby a bottle in bed to fall asleep and leaving it with him for the whole night (Rasbridge & Kulig, 1995).

The frequency of giving a bottle to fall asleep at night was higher in households below the low-income cut-off (poverty line, see Note 2, Table 2.2), namely 14% compared to 5% above. An infant was also twice as likely to be given the bottle in a single-parent household than in a two-parent one (15% vs. 7%). Therefore, this strategy could be the result of ignorance on the part of mothers who have low socioeconomic status, or the constraints of being a single mother (exhaustion related to lack of support, priorities primarily focused on everyday survival).

Table 2.2
Distribution of Infants by Use of Bottle to Fall Asleep at Night and Certain Sociodemographic Characteristics, 1998

	Bottle to fall asleep at night[1]		x^2
	Never	Sometimes or every night	
	%		
Age group of parents			
Single parent or both parents under 25 yrs of age	88.5	11.5*	Not signif.
At least 1 parent 25 yrs of age or over	93.1	6.9	
Education of mother			
No high school diploma	86.2	13.8	$p < 0.001$
High school, vocational/technical diploma	92.4	7.6	
College diploma or university degree	95.6	4.4*	
Immigration status of mother			
Non-immigrant or "European" immigrant	94.1	5.9	$p < 0.001$
Non-"European" immigrant	80.8	19.2	
Sufficient income[2]			
Yes	95.0	5.0	$p < 0.001$
No	85.6	14.4	
Family structure			
Two-parent	93.3	6.7	$p < 0.01$
Single-parent	84.9	15.1*	
Total	**92.5**	**7.5**	--

1. Weekly frequency.
2. Sufficient income (to meet basic needs) according to the low-income cut-off set by Statistics Canada (see No. 2 in this series of analytical papers).

* Coefficient of variation (CV) between 15% and 25%, interpret with caution.

Source: *Institut de la statistique du Québec, ÉLDEQ 1998-2002*

Analyses conducted excluding infants who were being only breast fed revealed the same associations (data not shown).

3. Use of the Bottle to Fall Asleep at Nap Time(s) During the Day

The results presented in Table 3.1 indicate that approximately one in ten infants had the bottle to fall asleep at nap time(s) during the day, sometimes or every day. Twelve per cent of them (1.3% of all babies) kept it while they were sleeping (data not shown).

Similar to what was observed for the night, in 3 out of 4 cases, the bottles contained infant formula. Cow's milk was given to only 12% of infants at nap time, followed by juice diluted with water (2.5%), formula with cereal (2.4%) or Farlay's-type biscuits (0.7%), and water (1.9%). Other liquids each accounted for 1% or less, namely a mixture of cow's milk and infant formula, juice, water with honey, or breast milk (data not shown).

Table 3.1
Distribution of Infants by Use of the Bottle to Fall Asleep at Daytime Naps, Time to Fall Asleep and Feeding Method, 1998

	Bottle to fall asleep during the day[1]		x^2
	Never	Sometimes or every day	
	%		
Time to fall asleep			
Less than 30 minutes	90.2	9.8	$p < 0.05$
30 minutes or more	80.7	19.3*	
Breast feeding			
Currently	96.3	3.7*	$p < 0.001$
Never or had stopped	85.7	14.3	
Total	**89.3**	**10.7**	--

1. Weekly frequency.
* Coefficient of variation (CV) between 15% and 25%, interpret with caution.

Source: *Institut de la statistique du Québec, ÉLDEQ 1998-2002.*

3.1 Frequency of Use of the Bottle To Fall Asleep, by Certain Characteristics of the Baby

When we compare night and day times for infant to fall asleep, an association was observed between giving a bottle to the baby at night and at nap time. Among the 8% of babies who took the bottle to bed at night sometimes or every night, 60% did the same for falling asleep at nap time during the day. In contrast, this practice was much less likely for infants who never received a bottle for falling asleep at night (7%) (data not shown). Given this association, it is not surprising that similar trends were observed related to certain predisposing factors presented earlier. The results indicate that neither birth order, premature status or low birth weight were associated with using the bottle to fall asleep for daytime naps (data not shown).

With regards to sleep habits (Table 3.1), only the time it took for the infant to fall asleep was analyzed; this variable was significantly associated with using the bottle at nap time during the day. Infants who were taking 30 minutes or more to fall asleep were twice as likely to have the bottle than those who fell asleep more quickly (19% vs. 10%). In terms of feeding method, of infants who were being breast fed at the time of the survey (breast or bottle), exclusively or in combination with cow's milk or formula, 3.7% were given a bottle to fall asleep during the day compared to 14% of those whose mother had never breast fed or had stopped doing so. As expected, the 17% of babies who were being exclusively breast fed had a very low frequency of this practice (0.3%) (data not shown).

3.2 Sociodemographic Characteristics Related to Using the Bottle for Daytime Naps

As indicated in the Annex 1, the practice of giving the baby the bottle to fall asleep at nap time(s) during the day was more likely in cases where the single parent or both parents were under 25 years of age, in mothers not having completed high school, in non-"European" immigrant mothers, in households below the low-income cutoff, and in single-parent families. Analyses excluding infants who only had had breast milk revealed the same results.

However, the deviation increased with regards to immigrant status of the mother; 25% of non-"European" immigrants used this practice compared to 11% of other mothers (data not shown).

Irrespective of the categories of variables analyzed, the prevalence of giving the infant the bottle to fall asleep for naps during the day was higher than that for this practice at night. The only exception was ethnic background. Non-"European" immigrant mothers used this practice with virtually the same frequency day or night (Tables 2.2 and Annex 1).

4. Non-Nutritive Sucking - Availability of the Pacifier for Falling Asleep in Bed

The availability of the pacifier for falling asleep was measured in the section on sleep habits in the Self-Administered Questionnaire for the Mother (SAQM). The mother was asked if her baby had one or more specific objects in the bed to help him fall asleep. The pacifier, baby bottle, teddy bear, blanket, mobile etc. were studied as transitional objects for falling asleep without reference to day or night. Although use of the pacifier is a non-nutritive sucking habit, the data collected in 1998 do not provide a precise estimate of its prevalence awake or asleep. This will be studied when the ÉLDEQ children are older. Therefore, only the availability of the pacifier as a transitional object for falling asleep, alone or in association with another object, was analyzed in relation to various characteristics of the baby, mother and household.

The results presented in Table 4.1 indicate that over almost 50% of the babies had a pacifier available as a transitional object for falling asleep. Not having one can be explained by the infant's rejection of it, the presence of the bottle in the bed for this purpose (night and/or day), by whether the infant was being breast fed or by the parents deciding it was unnecessary. Some of these interpretations could be verified. Among babies who had the bottle to fall asleep at night, less than 4 in 10 (36%) had a pacifier, whereas it was available in half of those who did not have a bottle to fall asleep at night. The proportion of infants who had a pacifier in the bed was higher in those who had never been breast fed or had ceased to be at the time of the survey (56%) than in those who were being breast fed (38%). However, as previously shown, 50% of the infants being breast fed were also being fed cow's milk or formula, making it possible that they were among those whose parents were using the bottle for helping them fall asleep. Babies being exclusively breast fed (17%), however, were probably less likely to be put to bed with a pacifier, given the recommendation not to give it to them in the first few weeks of life to promote breast feeding, a habit which would then likely persist (Dorè & Le Hénaff, 1998; Victora et al., 1993).

Table 4.1
Distribution of Infants by Availability of Pacifier, Alone or in Association with Another Object, To Fall Asleep in Bed, by Various Characteristics, 1998

	Pacifier to fall asleep in bed		x^2
	No	Yes	
	%		
Bottle to fall asleep in bed at night[1]			
Never	49.2	50.8	$p < 0.01$
Sometimes or every night	63.9	36.1	
Breast feeding			
Currently	62.1	37.9	$p < 0.001$
Never or had stopped	44.2	55.8	
Time to fall asleep			
Less than 30 minutes	49.1	50.9	$p < 0.001$
30 minutes or more	68.2	31.8	
Immigration status of mother			
Non-immigrant or "European" immigrant	48.6	51.4	$p < 0.001$
Non-"European" immigrant	63.6	36.4	
Sufficient income[2]			
Yes	47.8	52.2	$p < 0.01$
No	56.8	43.2	
Family structure			
Two-parent	49.5	50.5	$p < 0.05$
Single-parent	59.7	40.3	
Total	**50.3**	**49.7**	--

1. Weekly frequency.
2. Sufficient income (to meet basic needs) according to the low-income cut-off set by Statistics Canada (see No. 2 in this series of analytical papers).

Source: *Institut de la statistique du Québec. ÉLDEQ 1998-2002.*

Table 4.1 shows that, in terms of the time taken to fall asleep, approximately half of the infants who were taking less than 30 minutes to do so had a pacifier, whereas only 32% of the other

infants had this habit. These data suggest that the pacifier may indeed have a soothing effect.

Infants whose mothers were non-"European" immigrants were less likely to be given a pacifier to fall asleep. Approximately 36% of them had a pacifier in their bed compared to 51% of infants whose mothers were non-immigrants or "European" immigrants (Table 4.1). It can therefore be construed that this habit may be less rooted in the culture of certain ethnic communities where, for example, there are negative beliefs about the practice (Rasbridge & Kulig, 1995).

Contrary to what was observed in terms of using the bottle to help the baby fall asleep, night or day, the pacifier was less frequently used in households below the low-income cut-off and in single-parent families, namely 40% compared to 52% in households with the opposite characteristics. Availability of the pacifier was not however, associated with age or educational level of the parents (data not shown).

5. Receiving Vitamin and/or Mineral Supplements Containing Fluoride

In the Paper Questionnaire Completed by the Interviewer (PQCI), the names of vitamin and/or mineral supplements given to the 5-month-old baby were collected. From these, a list of products known to contain fluoride was generated.

The results obtained indicate that 23% of the infants were receiving a vitamin and/or mineral supplement. Only 1.7% of all infants were taking one with fluoride (data not shown). Clearly, such a low frequency was not conducive to conducting detailed analyses of the characteristics of these babies.

However, it is not surprising that few infants were given supplements containing fluoride, given that the dental profession recommends these for children 6 months of age and over when the water supply is not fluoridated.

6. Discussion

Inappropriate use of the baby bottle, such as letting an infant fall asleep with one containing cow's milk, breast milk, formula or juice, results in prolonged exposure of the teeth to sugars, and can increase the risk of caries. This survey has brought to light certain factors which may predispose use of the bottle as a sleep aid in bed for 5-month-olds, at night or for daytime naps. The results of ÉLDEQ 1998 show that 8% of infants 5 months of age had, sometimes or every night, a bottle to fall asleep in bed. For daytime naps, 11% of the infants had a bottle for the same weekly frequency. Two previous studies investigating current use of the bottle at bedtime on random samples representative of the general population (Hinds & Gregory, 1995; Kaste & Gift, 1995) reported prevalences of 18% and 20% in children 6 to 60 months and 30 to 42 months of age respectively. It can be expected, therefore, that the prevalence will increase in the ÉLDEQ infants over the course of this longitudinal study. In Year 1 (1998), among infants who had a bottle to fall asleep day or night, 75% received formula, 15% cow's milk and 5% other liquids containing sugars. Although water is the only liquid recommended for the bottle as a sleep comforter, only less than 2% were given this.

Even though on a province-wide scale, few infants were using the bottle to fall asleep at night or during the day, the trends observed suggest certain targets for intervention. The proportion of infants who fell asleep at night sometimes or always with the help of a bottle was higher in those who were not sleeping through the night, whereas taking 30 minutes or more to fall asleep was only associated with use of the bottle for daytime naps. Babies being breast fed (receiving mother's milk from the breast or the bottle) at the time of the survey (34%), exclusively or in combination with cow's milk or formula, had a lower frequency of having the bottle in bed, day or night, compared to those whose mother had never breastfed or had ceased to do so. The practice was more frequent in mothers who did not have a high school diploma, were non-"European" immigrants, had household income below the low-income cut-off or were single parents. Unfortunately, due to the low numbers in certain categories of variables, the confounding effect of various factors on the associations could not be controlled for, by either multiple stratified analyses or multivariate models.

Using a pacifier is a non-nutritive habit that can have an effect on dentition, depending on the intensity, duration and frequency. It should be noted that the data collected in 1998 did not permit a precise estimate of the prevalence of pacifier use, awake or asleep. This will be done in future 'volets" of ÉLDEQ 1998-2002. The results did, however, reveal that one in two infants had a pacifier in bed, alone or in association with another object, as a transitional object for falling asleep. In a previous study conducted in Québec, 89% of mothers of firstborns 6 months of age had already offered their infant a pacifier; one in six, however, had refused it (Lepage & Moisan, 1998).

In contrast to the bottle, having a pacifier as a sleep aid was more frequent in infants who were taking less than 30 minutes to fall asleep. There is likely either a soothing effect observed with the pacifier or a tendency to offer it less frequently than the bottle to infants who take longer to fall asleep. The proportion of infants who had a pacifier in bed was higher in those whose mother had never breast fed or who had ceased to do so at the time of the survey. The recommendation not to give a pacifier in the first few weeks of life to encourage breast feeding could possibly have resulted in the latter persisting as habit to the age of approximately 5 months (Doré & Le Hénaff, 1998; Victora et al., 1993).

Infants whose mothers were non-"European" immigrants had a lower frequency of having a pacifier to fall asleep. The availability of a pacifier was also less frequent in households below the low-income cut-off.

The former may suggest that there is a sociocultural effect related to using the bottle or the pacifier for soothing the baby while falling asleep. It could be surmised that when non-"European" immigrant mothers use the bottle to feed their baby, they reproduce feeding practices related to the beliefs and values of their countries of origin. Using a bottle to help the baby fall asleep may also signify concern for the baby's well-being by making sure he eats enough, instead of simply offering a pacifier (Rasbridge & Kulig, 1995). It can also be postulated that there is a lack of information on the deleterious effects of using a bottle to help the baby fall asleep because of language or cultural barriers.

Greater use of the bottle may also be the result of ignorance or choice in parents who are young, have a low educational level or a disadvantaged background, or constraints related to single-

parent status. However, it should be noted that parents can acquire new practices in the transition from breast feeding to using infant formula.

Very few of the infants in the 1998 survey were taking fluoride supplements. This indicates that the parents seemed to be following the recommendation to start these only after a baby is 6 months old if there are no other sources of fluoride. However, an increase in the proportion of infants receiving fluoride supplements is foreseen in the coming years of this longitudinal study. It has been observed that 18% of a sample of Québec firstborns had already taken these by the age of 6 months (Lepage & Moisan, 1998).

Few results presented here lend themselves to be compared with those in the literature, given the unique character of Year 1 of the longitudinal study, which was conducted on infants before the eruption of teeth and the appearance of oral and dental health problems. ÉLDEQ 1998-2002 is indeed providing data on many habits related to dental health at a very early age. We can therefore document current parenting practices without the bias associated with retrospective studies of older children. Although it does not provide all the answers to many questions, the knowledge generated by this first year of the longitudinal study can serve to guide prevention and promotion interventions in oral and dental health. For example, intervention tools could be developed to target specific groups such as young, less educated, non-"European" immigrant, and/or low income parents. Other beneficial interventions could be integrated into parenting programs targeting the feeding and sleep behaviours of young children.

Subsequent years of this study, while monitoring the practices previously described, will be examining other determinants of dental health, such as oral hygiene, eating and sucking habits, use of dental services and general health status of the child. Additional factors likely to influence parenting practices related to dental health will also be explored, such as sleep habits, temperament and the child's overall development. Finally, a clinical examination of all the children might be conducted, which along with the other data collected, should help us better understand the etiology of oral and dental health problems in Québec children of pre-school age.

Annex 1

Distribution of Infants by Use of Bottle to Fall Asleep at Daytime Naps and Certain Sociodemographic Characteristics, 1998

	Bottle to fall asleep during the day[1]		x^2
	Never	Sometimes or every day	
	%		
Age group of parents			
Single or both parents under 25 yrs	82.8	17.2*	$p < 0.05$
At least 1 parent 25 years or older	90.2	9.8	
Education of the mother			
No high school diploma	80.6	19.4	$p < 0.001$
High school, vocational/technical diploma	88.5	11.5	
College diploma or university degree	94.4	5.6	
Immigrant status of mother			
Non-immigrant or "European" immigrant	90.5	9.5	$p < 0.01$
Non-"European" immigrant	80.6	19.4*	
Sufficient Income[2]			
Yes	92.4	7.7	$p < 0.001$
No	80.9	19.1	
Family structure at the time of the survey			
Two-parent	90.5	9.5	$p < 0.01$
Single-parent	78.4	21.6*	
Total	**89.3**	**10.7**	--

1. Weekly frequency.
2. Sufficient income (to meet basic needs) according to the low-income cut-off set by Statistics Canada (see No. 2 in this series of analytical papers).

* Coefficient of variation (CV) between 15% and 25%; interpret with caution.

Source: *Institut de la statistique du Québec, ÉLDEQ 1998-2002.*

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Glossary

Centre de la petite enfance	Child-care centre
Commission d'accès à l'information du Québec - CAI	Québec Access to Information Commission
Conseil québécois de la recherche sociale (CQRS)	Social Research Council of Québec
Direction de la méthodologie et des enquêtes spéciales, ISQ	Methodology and Special Surveys Division, ISQ
Direction de la santé publique de la Régie régionale de la santé et des services sociaux de Montréal-Centre	Public Health Department, Montréal-Centre Regional Health Board
Direction de la technologie et des opérations statistiques, ISQ	Technology and Statistical Operations Division, ISQ
Direction des normes et de l'information, ISQ	Standards and Information Division, ISQ
Direction Santé Québec, ISQ	Health Québec Division
Étude des jumeaux nouveaux-nés au Québec - ÉJNQ	Québec Study of Newborn Twins
Fichier maître des naissances	Master Birth Register
Fonds de la recherche en santé du Québec (FRSQ)	Health Research Fund of Québec
Fonds pour la formation de chercheurs et l'aide à la recherche (FCAR)	Researcher Education and Research Assistance Fund
Groupe de recherche sur l'inadaptation psychosociale chez l'enfant - GRIP	Research Unit on Children's Pyschosocial Maladjustment
Institut de la statistique du Québec, ISQ	Québec Institute of Statistics
La Politique Familiale	Policy on Families
Le Rapport Bouchard (1991) « Un Québec fou de ses enfants »	The Bouchard Report, 1991: A Québec in Love with its Children
Les Priorités nationales de santé publique	Priorities for Public Health
ministère de l'Éducation	Ministry of Education
ministère de la Famille et de l'Enfance	Ministry of Family and Child Welfare
ministère de la Justice	Ministry of Justice
ministère de la Recherche, Science et Technologie	Ministry of Research, Science and Technology
ministère de la Santé et des Services sociaux du Québec (MSSS)	Ministry of Health and Social Services of Québec
ministère de la Sécurité publique	Ministry of Public Security
ministère de la Solidarité sociale	Ministry of Social Solidarity - formerly Income Security (Welfare)
Politique de la santé et du bien-être	Policy on Health and Well-Being
Service de la recherche	Research services
Service de support aux opérations de la Régie de l'assurance-maladie du Québec - RAMQ	Operations Support Section of the Québec Health Insurance Board

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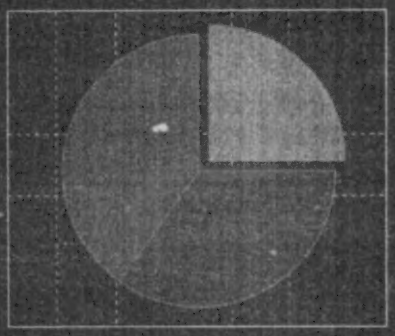
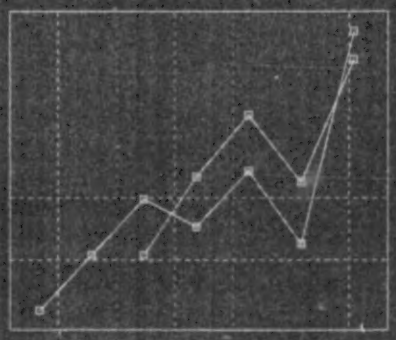
The characteristics of oral and dental health problems of Québec children under 5 years of age are still poorly known. The biological risk factors of dental caries are well understood, but the role of associated behavioural, psychosocial and socioeconomic factors remains less clearly defined. This first year of the longitudinal study provided data on habits related to the dental health of 5-month-old infants. Various characteristics of the infants, mothers and households were examined in association with the use of a baby bottle and pacifier for falling asleep at night or nap time during the day. Use of fluoride supplements was also investigated. Subsequent years of the study will analyze other determinants of oral and dental health in young children, such as oral hygiene, diet, and use of dental services. Ultimately, a clinical examination might be conducted in a future year of the study to help better understand the etiology of oral and dental health diseases by evaluating the influence of these various factors.





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